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ries being devoted to subjects more purely geometrical; as the First Series (already printed) relates chiefly to others which are of a more algebraical character.

Dr. Apjohn read a paper on the composition and optical properties of a variety of hyalite, from Mexico.

"This mineral," he observed, "came into my possession as Professor of Mineralogy to the University, having been presented, through Mr. Ball, to the College Museum, by Professor Radice. It occurs in detached mammillary and wrinkled masses, sometimes larger than a walnut, and pellucid in a high degree. It is harder than glass, but is scratched by steel, and, from an experiment very carefully made, was found to have the specific gravity of 2.1016. It is much more frangible than quartz, but when broken exhibits something of the conchoidal fracture.

"The different properties just enumerated belong also to other well-known varieties of hyalite; and, notwithstanding its occurring in detached glassy drops of unusual size, little hope was entertained that a chemical examination of it would conduct to any new result. Upon, however, subjecting it to experiment, this anticipation was not verified, for it was found to contain much less water than any variety of hyalite whose composition has been recorded. Thus, as the mean of four experiments scarcely differing from each other, it yielded,

Silex, ...	97.48
Water, ...	2.52

results which correspond accurately with the formula

$$15SO_3, 2HO.$$

"Beudant says, that in the case of the transparent opals, by which he, of course, means the *hyalites*, the loss by calcination amounted always, in his experiments, to from eight to ten per cent.; while, in the case of the semiopaque opals, the volatile matter expelled by heat varied from five to seven per cent. And in two analyses of hyalite, the details of which he gives, the water was in one 6.35, and in the other 8.68 parts in 100. The Mexican hyalite, therefore, is quite peculiar as respects the amount of its constituent water, this being not more than two-fifths of what has been found in the least hydrated variety of the mineral whose analysis has been published.

" The most remarkable circumstance connected with this mineral remains to be mentioned. The hyalites are, in all treatises on mineralogy, described as single refractors ; but, upon transmitting through the Mexican hyalite a ray of plane-polarized light, and examining it in the usual manner, with an analyzing eye-piece, it was found to possess in a very marked degree the property of depolarizing the ray. The action, however, exerted by it, appeared of an anomalous kind ; for, while in all doubly-refracting minerals, whether uniaxal or biaxal, there are two positions of the crystal, in which, if interposed (for example) between two tourmalines whose axes are crossed, the light continues excluded, there is no position into which a lamina of this hyalite can be brought, by revolving it in its own plane, in which the light will not be restored.

" The action, therefore, of this mineral on polarized light is not of the ordinary kind, and can, as far as my knowledge of this difficult subject extends, only be explained by supposing that, like rock crystal in one particular direction, and certain essential oils and aqueous solutions of sugar, dextrine, &c., it possesses the power of changing the position of the plane of polarization of a plane polarized ray, or of causing it to revolve through a greater or less angle. This view would seem to be corroborated by the following experiments.

" 1. A ray of homogeneous red light was made to pass through a lamina of the hyalite, on which nearly parallel planes were cut and polished, this lamina being interposed between a pair of crossed tourmalines. The light was thus restored, and, by rotating the tourmaline next the eye to the *right*, it was again very nearly extinguished.

" 2. The preceding experiment was repeated with yellow light, got from a spirit-lamp with salted wick, and with the same results.

" 3. Upon substituting for the light of the spirit that transmitted through a window-blind of a yellowish colour, the phenomena of the last experiment were very distinctly reproduced.

" 4. In operating, by aid of the apparatus used in the preceding experiments, with heterogeneous or solar light, and making the analyser revolve, a series of tints were produced, much feebler than those exhibited by quartz, but following apparently the same law.

" From these facts I think I am justified in concluding, that this hyalite exercises the power denominated rotatory polarization. This property, too, it possesses, no matter in what direction it is traversed by the plane polarized ray, a circumstance which would seem to identify it with that exerted by liquids, and distinguish it from the analogous influence of quartz, which is manifested only in the direction of the optic axis.

" Before concluding this paper I may be permitted to give expression to an opinion, which is, I believe, shared by most mineralogists, namely, that hyalite, opal, and calcedony, have all had a similar origin, or were originally silex in the gelatinous condition which it assumes when certain alkaline silicates are dissolved in dilute acid, and their solutions are slowly evaporated. All three include water, the hyalite in greatest, and the calcedony in smallest quantity; and in some specimens that I have seen, these minerals may be observed to pass by insensible gradations into each other. This is well illustrated by some lumps of the Mexican hyalite which have nodules of calcedony attached to them, the latter mineral differing in no respect from the former, save in being less transparent, and containing a smaller quantity of water,—its amount being about 0.53 per cent., according to a single experiment. The water, too, in all, is, I believe, present, not in a state of chemical, but of mechanical union, and gives to these minerals the different degrees of transparency which they exhibit, just as water confers the same property upon specimens of hydrophane or tabasheer, into whose pores it has been introduced by capillary absorption.

" From the analogy as to chemical constitution between hyalite and calcedony, one might be inclined to conclude that both would modify light transmitted through them in a similar manner. This idea, however, would appear to be inconsistent with experiment, for a plate of agate is said to polarize light in the ordinary manner, or in a single plane; and Sir David Brewster is of opinion that the action which it exerts is of the same nature with that which belongs to tourmaline. These statements are certainly not true of the mineral which I have this evening brought under the notice of the Academy.

" P. S.—Since the preceding remarks were put together, I have found that a ray of light polarized by reflexion, and made to disappear by the interposition of a Nicholl's prism, was restored when made to pass through a particle of hyalite from Frankfort on the Maine. *All* varieties, therefore, of this mineral may be concluded to possess the same optical properties.

"In respect to the experiments above detailed, I have found that the results are somewhat different, according to the part of the lamina of hyalite traversed by the light, the change in the position of the plane of polarization not having always the same direction or value, and being sometimes null. This fact would seem to point to a different explanation of the phenomena from that already suggested, and to identify the optical characters of hyalite with those of rock crystal, the differences being explicable upon the hypothesis of the former mineral being composed of a multitude of minute crystals of the latter, thrown together without any regular or symmetric arrangement."